

MAY							JUNE						
S	M	T	W	T	F	S	S	M	T	W	T	F	S
						1			1	2	3	4	5
30	31	1	2	3	4	5	6	7	8	9	10	11	12
2	3	4	5	6	7	8	13	14	15	16	17	18	19
9	10	11	12	13	14	15	20	21	22	23	24	25	26
16	17	18	19	20	21	22	27	28	29	30			
23	24	25	26	27	28	29							

21st week
140-225

25.47

20

Thursday

Q:5.

$$n = 52$$

$$\bar{x} = 98.28$$

$$s = 0.6824$$

$$t = \frac{\bar{x} - \mu}{s/\sqrt{n}}$$

$$t = \frac{\bar{x}_1 - \bar{x}_2}{\sqrt{\frac{s_1^2}{n_1} + \frac{s_2^2}{n_2}}}$$

(a) Are the necessary conditions for constructing valid 't' interval satisfied? Explain.

⇒ Confidence intervals are conducted using statistical methods such as t-test. A t-test is a type of inferential test used to determine if there is a significant difference between the means of two groups which may be related to certain features.

Calculating a t-test req. 3 key data values called as mean difference, standard deviation & number of data values.

b) Find 98% confidence interval for the mean body temp. & explain its meaning.

21

Friday

2/100

May

$$n = 52$$

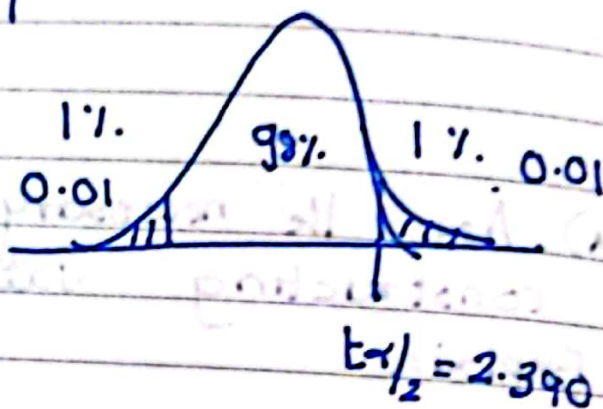
$$\bar{x} = 98.28$$

$$s = 0.6824$$

98% CI $\Rightarrow \alpha = 0.02 \Rightarrow$ area in two tails

degree of freedom: $n-1$, $52-1 = 51$
 freedom

$$t\text{-table} = 2.390$$



Using Excel

$$= t.\text{inv.}2t(0.02, 51) \\ \approx 2.401$$

Use $t_{\alpha/2}$ from table

$$E = \frac{2.390 (0.6824)}{\sqrt{52}} = \frac{1.630}{7.2111} = 0.226$$

Using $t_{\alpha/2}$ from Excel

$$E = \frac{2.401 (0.6824)}{\sqrt{52}} = \frac{1.63776}{7.2111} \approx 0.22711$$

MAY							JUNE						
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21st week
142-223

22

Saturday

$$\bar{x} = 98.28$$

$$\begin{aligned}\text{Upper band} &= \bar{x} + E = 98.28 + 0.227 \\ &= 98.50\end{aligned}$$

$$\begin{aligned}\text{lower band} &= \bar{x} - E = 98.28 - 0.227 \\ &= 98.05\end{aligned}$$

Mean Value lies between 98.50 & 98.05

(c) Give a two sided hypothesis test for a mean body temp of 98.6°F & use the information above to evaluate a test with significance level $\alpha = 0.02$.

\Rightarrow Null hypothesis :
Body temp of adult (healthy) is 98.6°F

$$H_0 = \mu = 98.6$$

Alternate hypothesis :
Body temp of adult (healthy) is not equal to 98.6°F

$$\therefore H_A = \mu \neq 98.6$$

24

Monday

22nd week
144-221

May

$$\alpha = 0.02$$

$$\alpha/2 = 0.01$$

$$z = \frac{\bar{x} - \mu_0}{s/\sqrt{n}}$$

$$= \frac{98.28 - 98.6}{0.6824/\sqrt{52}}$$

$$= \frac{98.28 - 98.6}{0.6824/\sqrt{52}}$$

$$= \frac{-0.32}{0.094}$$

$$= -3.404$$

$$z_c = -3.404$$

with 98% confidence level
null hypothesis can be rejected

so the average body temp of
healthy adult is not 98.6 F.

